All references, including any patents or patent applications cited in this specification are hereby incorporated by reference. No admission is made that any reference constitutes prior art. The discussion of the references states what their authors assert, and the applicants reserve the right to challenge the accuracy and pertinency of the cited documents. It will be clearly understood that, although a number of prior art publications are referred to herein, this reference does not constitute an admission that any of these documents form part of the common general knowledge in the art, in New Zealand or in any other country.

It is acknowledged that the term 'comprise' may, under varying jurisdictions, be attributed with either an exclusive or an inclusive meaning. For the purpose of this specification, and unless otherwise noted, the term 'comprise' shall have an inclusive meaning - i.e. that it will be taken to mean an inclusion of not only the listed components it directly references, but also other non-specified components or elements. This rationale will also be used when the term 'comprised' or 'comprising' is used in relation to one or more steps in a method or process.

It is an object of the present invention to address the foregoing problems or at least to provide the public with a useful choice.

Further aspects and advantages of the present invention will become apparent from the ensuing description which is given by way of example only.

DISCLOSURE OF THE INVENTION

According to one aspect of the present invention there is provided a simulator for board sports including:

a pair of foot bindings for holding a rider's feet;

a pivoting mount assembly for pivoting both the foot bindings together about a first

simulator axis to simulate edge-to-edge roll movement of a board about its longitudinal or roll axis, the pivoting mount assembly including a ground-supported base pivotally connected to a pivoting member to which at least one of the foot bindings is attached for movement toward and away from the other of the foot bindings, and

adjustment means operatively connected to said at least one of the foot bindings for moving said at least one of the foot bindings toward and away from the other of the foot bindings to adjust the spacing between the pair of foot bindings while the rider's feet are held thereby.

The simulator allows a rider to simulate at least one pivoting movement that is made to manoeuvre a snowboard, or the like. The movement between the bindings toward and away from one another is preferably a linear movement. It will be understood that while a pivoting pavement may move part of a binding toward and away from the other binding, the relative movement must be of the whole binding. Preferably the movement is linear sliding movement e.g. the at least one binding is fixed for sliding on a linear track, in a linear slot, or the like. The rider is thereby able to dynamically determine the effect of adjustments on the width of his stance (determined by the spacing between the foot bindings) on his ability to balance about the first simulator axis.

In the preferred embodiment the pivoting of the foot bindings about the first simulator axis is adapted to simulate edge-to-edge roll movement of a board about its longitudinal or roll axis, the at least one of the foot bindings, or both of the foot bindings, being mounted for sliding movement in a direction substantially parallel to the first simulator axis. It will be understood that pivoting about the longitudinal or roll axis of a board is important in steering the board to transfer weight between the opposing longitudinal edges of the board.

Optionally the simulator may be adapted for simulating pivoting or rotation about a pitch axis and/or about a yaw axis of the board. In addition to pivoting about the first simulator axis therefore, the simulator may include means for pivoting both the foot bindings together about mutually orthogonal pitch and yaw axes, both of which are perpendicular to the first simulator axis.

Advantageously the foot bindings are fixed together for pivoting about the first simulator axis. The foot bindings may be fixed to a platform for simulating a snowboard, or the like. Most preferably, for simulating the manner of mounting foot bindings on a snowboard, the foot bindings include boot bindings. A support is fixed to the pivotal attachment for supporting the foot bindings, preferably upon the ground. A handle may be fixed to the support to assist the rider and prevent a fall.

The pivoting mount assembly preferably includes at least one resilient pivot connecting the ground-supported base and pivoting member to provide the pivoting movement about the simulator axis while also biasing a foot-supporting surface of each foot binding toward the horizontal plane. Alternatively, the pivotal attachment may include a journal and separate resilient means.

Most preferably the pivoting mount assembly includes two elastomeric pivots, at least one of which is mounted for sliding movement parallel to the first simulator axis for movement between a widely spaced position to provide substantially roll movement of the boot bindings about the first axis, and any one of more closely spaced positions configured for providing an increased degree of pivoting movement of the bindings about mutually orthogonal pitch and yaw axes, both of which are perpendicular to the first simulator axis.

In a preferred embodiment both foot bindings are adapted to be simultaneously moved for adjusting the spacing between the foot bindings in a direction substantially parallel to the first simulator axis. This may be achieved, for example, by a screw-type

adjuster, manually or power-operated linear actuators etc. Optionally one or both foot bindings are fixed in a track extending parallel to the first simulator axis for movement to adjust the spacing between the foot bindings. The means for adjusting the spacing between the foot bindings is preferably a screw-type adjuster, but it will be understood that other manually or power-operated linear actuators may also be used. The screw-type adjustment mechanism is preferably connected to the at least one foot binding for sliding the at least one foot binding toward and away from the other of the foot bindings for adjusting the spacing therebetween while the rider's feet are held by the foot bindings. When both the bindings are mounted for sliding movement the adjustment mechanism includes: a screw threaded adjuster rod having a handle; a screw block received on the adjuster rod; sliding blocks connected to the bindings, and an arm pivotally connected to each sliding block and to the screw block.

The simulator may further include means for measuring the spacing between the centres of the foot bindings, such as a ruler. An alignment indicating device, such as a plumb line or level, may also be provided to assist in aligning the centre of the rider's knee vertically with his foot. The alignment indicating device may include a knee-receiving cup fixed to each foot binding, the position of the knee-receiving cup being adjustable to align with the knees of different users, the cup being adjustable in a plane extending orthogonally to a foot-supporting surface of the binding and substantially aligned with the centre of the rider's foot. A rod assembly may be fixed to the binding, extending generally perpendicular to a base of the binding or platform and able to telescope to align vertically with the knees of different height users.

In addition to this freedom of adjustment of the foot bindings in the longitudinal direction, the simulator preferably includes means for adjustment of the foot bindings by rotation of each foot binding about a central axis substantially intersecting with and extending orthogonally to the first simulator axis for adjusting the angle between the midline of the foot and the first simulator axis.

Means may also be provided for movement of the foot bindings lateral to the first simulator axis. The means for means for providing each of these adjustments is preferably adapted to allow for adjustment while the rider is held in the foot bindings e.g. by a separate operator or by remote control means operated by the rider.

The simulator preferably further includes a rider's seat, upon which the rider may sit with his feet secured by the bindings. Additionally, an operator's seat may also be provided for seating an operator while he operates the adjustment mechanism. The rider's seat and operator's seats are preferably fixed on opposing sides of the pivoting mount assembly.

According to another aspect of the present invention there is provided a simulator for board sports including:

a pair of foot bindings for holding a rider's feet;

a pivoting mount assembly for pivoting both the foot bindings about a first simulator axis to simulate pivoting movement of a board, and characterised in that

the pivoting mount assembly includes two elastomeric pivots mounted for sliding movement parallel to the first simulator axis for movement between a widely spaced position to provide substantially roll movement of the boot bindings about the first axis, and any one of more closely spaced positions configured for providing an increased degree of pivoting movement of the bindings about mutually orthogonal pitch and yaw axes, both of which are perpendicular to the first simulator axis.

This invention provides a simulator which is effective and efficient in operational use, and which is versatile in operation, allowing it to be used to assist board riders determine their stance and also for training riders in different courses of movement. The simulator may be economically constructed and has an overall simple design which minimizes manufacturing costs.

BRIEF DESCRIPTION OF THE DRAWINGS

Further aspects of the present invention will become apparent from the following description which is given by way of example only and with reference to the accompanying drawings in which:

Figure 1 is a perspective view of the simulator of the present invention;

Figure 2 is an exploded view of the simulator of Fig. 1;

Figure 3 is a front elevation of the simulator of Fig. 1;

Figure 4 is an exploded pictorial view of the mount of the simulator of Fig. 1;

Figure 5 is an exploded pictorial view of part of the platform assembly of the simulator of Fig. 1;

Figure 6 is an exploded pictorial view of the boot bindings of the simulator of Fig. 1, and

Figure 7 is an exploded pictorial view of the alignment indicating device of the simulator of Fig. 1

BEST MODES FOR CARRYING OUT THE INVENTION

Referring to Figs 1 - 3, a simulator 100 according to the present invention for board sports, and in particular snowboarding, is shown having a frame 30 with a rider's seat 31 and an operator's seat 32 positioned either side of a platform assembly 33 supported on a pivoting mount 34. The platform assembly 33 includes a platform 5 to which a pair of foot bindings or boot bindings 2a, 2b are mounted for holding the a rider's feet while the mount 34 allows the platform assembly 33 to pivot primarily about a first simulator axis A to simulate edge-to-edge roll of a snowboard about its longitudinal centreline.